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(54) Title of the Invention: Pneumatic Tire

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## Specifications

1. Title of the Invention Pneumatic tire
2. Scope of Patent Claims

1. A pneumatic tire, with regard to a pneumatic tire possessing a tread portion formed by multiple blocks or ribs that divide the contact surface through the cutting of main grooves into the contact surface, characterized by

the rubber composition at the peripheral portions of the blocks or ribs that differs with these central portions being placed with a thickness of 0.3~10 mm,

the dynamic modulus of elasticity(1) of the rubber composition of the central portion being 60~140 kgf/cm$^2$ and the dynamic modulus of elasticity(2) of the rubber composition of the peripheral portion being 110~190 kgf/cm$^2$ at room temperature, and

with the value of dynamic modulus of elasticity(2) minus the value of dynamic modulus of elasticity(1) being a value within the range of 10~90 kgf/cm$^2$.

2. Pneumatic tire of Claim 1 wherein the portion within a range of 3~20 mm from the edge of both shoulder portions of the above-mentioned tread is formed from the same rubber composition as the above-mentioned rubber composition that forms the peripheral portion of the block or rib.

3. Pneumatic tire of Claim 1 or Claim 2 wherein the rubber composition of the above-mentioned peripheral portion is placed only at the lateral surface of the circumferential direction of the block or rib.

4. Pneumatic tire of Claim 1 which is a pneumatic tire characterized by the rubber composition of the peripheral portion appearing from the position at least ½ the height of the initial depth of main groove and with the tread surface also covered by the rubber composition of that peripheral portion.

3. Detailed Explanation of the Invention

(Field(s) of Industrial Applications)

This invention is related to pneumatic tire in which the abrasion resistance and resistance to irregular abrasion are improved at the same time.

(Prior Art)

The tire tread portion that contacts the road surface is generally formed from one type of rubber. However, there are differences in the degree of abrasion exhibited due to the distribution of forces acting within the contact surface, the distribution of the tread block's motions and the distribution of the slip rate, and thus, the tire's lifespan, external appearance and the likes arising from the uneven abrasion of the tread's contact surface and the occurrence of the so-called irregular abrasion phenomenon are not preferred.

Previously, for this sort of irregular abrasion, for example, the method used was that of the method as in Patent Publication 1976-100504(S51-100504) where rubber with high resistance to abrasion is placed at the tread's shoulder portion, or the method as in Patent Publication 1978-80602(S53-80602) where rubber with a thickness corresponding to ¼ to 1/3 of the block width and possessing a higher resistance to abrasion than the tread rubber is placed at the periphery of the groove set up on the tread's contact surface.

(Issue(s) Solved by the Invention)

Based on these methods, certainly there were results in the improvements for the resistance to irregular abrasion. However, the lifespan of these tires is dependent on the rubber quality of the central portion of the tread with degraded abrasion resistance, and although the resistance to irregular abrasion was improved, the level of abrasion resistance was inadequate.

So, the purpose of this invention is to present a pneumatic tire with improved abrasion resistance and resistance to irregular abrasion at the same time, for which the improvements were previously unobtainable.

(Means of Solving the Issue(s))

In order to achieve the above-mentioned objectives, this invention's pneumatic tire, possessing a tread portion formed with multiple blocks or ribs by dividing the contact surface through cutting main grooves into the contact surface, is characterized by the placement of a rubber composition, with a thickness of 0.3~10 mm and which is different from these central portions, at the peripheral portion of the above-mentioned blocks or ribs, and where at room temperature, the dynamic modulus of elasticity E'(1) of the rubber composition of the central portion is 60~140 kgf/cm$^2$ and the dynamic modulus of elasticity E'(2) of the rubber composition of the peripheral portion is 110~190 kgf/cm$^2$ with the value of the above-mentioned E'(2) minus the value of the above-mentioned E'(1) being a value within the range of 10~90 kgf/cm$^2$.

In this invention, it is preferred that the rubber composition within 3~20 mm from the edges of both shoulder portions of the tread being the same as the rubber composition forming the peripheral portion of the blocks or ribs.

In addition, for this invention, it is also fine to place the rubber composition of the above-mentioned peripheral portion only at the lateral surface of the circumferential direction of the block or rib.

Furthermore, in this invention, with regard to the pneumatic tire, it is possible to make the rubber composition of the peripheral portion appear from a position at least ½ the height of the initial depth of main grooves and also to cover the tread surface with the rubber composition of the peripheral portion.

(Effects)

For the irregular abrasion that arises mainly at the edges such as that of the pneumatic tire's shoulder, rib and block, it is known that both the motion amount and slip rate are larger at the peripheral portion when compared with the contact surface, and it occurs due to the rapid development of abrasion. Therefore, in this invention, rubber with higher elasticity than central portion 2 is placed at peripheral portion 3 of block or rib 1 as the structure shown in Figures 1~3, and improvements in the resistance to irregular abrasion was designed by making the block or rib's motions and slip rate to be entirely uniform. In addition, for the rubber composition of central portion 2 which is important in abrasion resistance, if just the dynamic modulus of elasticity is set to be within the prescribed range, the other properties can be freely controlled and at the same time, it is

sufficiently possible to make adjustments that should increase abrasion resistance. In this way, it is possible to obtain a pneumatic tire with the abrasion resistance and resistance to irregular abrasion improved at the same time.

In this case, the thickness of the rubber composition of peripheral portion 3 is 0.3~10 mm with 0.5~5 mm being preferred. If it is less than 0.3 mm, no improvement is seen for the resistance to irregular abrasion, and on the other hand, if it exceeds 10 mm, the improvement of abrasion resistance becomes smaller.

For edge portion 5, due to similar reasons, it is necessary for rubber composition of peripheral portion 3 to enter within a range of 3~20 mm from edge 5 of both shoulder portions of the tread.

In addition, as shown in Figure 4, it is not necessary for block or rib 1 possessing the rubber composition of peripheral portion 3 to be found on the entire surface of the tread surface, and it is fine if it is placed at appropriate portions. Furthermore, it is also not necessary for thickness (Q) of the peripheral block to be entirely uniform, and it does not matter if differences exist depending on location as long as it is within the above-mentioned thickness range.

In this invention too, it is necessary for E'(1) of the rubber composition of the above-mentioned central portion at room temperature to be within the range of 60~140 kgf/cm$^2$ with 80~120 kgf/cm$^2$ being preferred. If E'(1) is smaller than 60 kgf/cm$^2$, the improvement result for abrasion resistance is not substantively adequate, and conversely, if it is larger than 140 kgf/cm$^2$, it is not appropriate from the aspect of exothermic ageing [J2E translator: probably "heat generation and ageing" but comma separator is missing in original Japanese]. It is also necessary for E'(2) of rubber composition of peripheral portion 3 at room temperature to be within the range of 110~190 kgf/cm$^2$ with 140~180 kgf/cm$^2$ being preferred. If E'(1) [J2E translator: E'(1) as in original Japanese] is smaller than 110 kgf/cm$^2$, uniform effects and adequate control of block motions are not obtainable, and on the other hand, if it exceeds 190 kgf/cm$^2$, it is inappropriate from the aspect of heat generation, ageing (cracks) or cut resistance. Furthermore, it is necessary for the difference of E' expressed by E'(2)-E'(1) to be within the range of 10~90 kgf/cm$^2$.with 20~60 kgf/cm$^2$ being preferred. If there is deviation from this range, the problem of not being able to adequately make the rubber motions of central portion 2 and peripheral portion 3 uniform as well as the problem of damage from the interface arise.

This invention's pneumatic tire, for example, is obtainable by forming central region 2 of block or rib 1 during green tire molding, forming peripheral region 3 of block or rib on the above-mentioned tread rubber, sheet-shaping the above-mentioned rubber and pasting, and after vulcanizing inside the mold, shaving so that the tread pattern surface turns into the prescribed 2-layer structure. Furthermore, as shown in Figure 5, there is no shaving of the tread pattern surface, and it is also fine for the surface to be covered by the rubber forming the peripheral portion of block or rib 1, and for the formation of a 2-layer structure with the rubber of the corresponding peripheral portion appearing from the position at least ½ the height of initial main groove depth of main groove 4. This is because it is rare for marked irregular abrasion to show up in the initial period of travel, and it can be said that the improvements to abrasion resistance and resistance to irregular abrasion are adequately attainable if a 2-layer structure is manifested with the remaining grooves being at least at the 1/2 position. In addition, when industrial productivity is considered, the chipping of tread surface is not a reality, and it can be said that a product with the surface covered by the rubber composition of peripheral portion 3 is more of a reality.

Furthermore, each rubber composition's E' was measured with short book-shaped samples under conditions of 50Hz vibration frequency, 1% dynamic distortion and 25°C using a spectrometer test machine made by Iwamoto Seisakusho Co., Ltd.

(Embodiment(s))

This invention is further explained in detail below by showing the embodiments.

The rubber compositions blended according to the blending ratios (weight portions) shown in Table 1 were matched to the combination of treads on size 10.00R2 pneumatic tires (refer to Figure 3) possessing 4 grooves on the tread's contact surface, and the trial-production tires of each type of structure were produced. The evaluations on abrasion resistance and resistance to irregular

abrasion were respectively made based on observations of the tread contact surface and remaining groove amounts after traveling for 40,000 kilometers.

Table 1

| Rubber Type | A | B | C | D | E |
|---|---|---|---|---|---|
| Natural rubber | 100 | 100 | 70 | 55 | 40 |
| Butadiene rubber *1 | – | – | 30 | – | – |
| Styrene-butadiene rubber *2 | – | – | – | 45 | 60 |
| ISAF carbon black | 45 | 50 | 55 | 50 | 55 |
| Stearic acid | 2 | 2 | 2 | 2 | 2 |
| Anti-ageing agent *3 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| ZnO | 3 | 3 | 3 | 3 | 3 |
| Sulfur | 1.3 | 1.5 | 1.5 | 1.0 | 1.1 |
| Vulcanization accelerator (Nobs) *4 | 1.1 | 1.1 | 1.1 | 1.1 | 1.3 |
| E' (kgf/cm$^2$) | 50 | 80 | 120 | 150 | 200 |
| Abrasion resistance *5 | 95 | 100 | 130 | 95 | 95 |

*1...Made by Japan Synthetic Rubber Co., Ltd, product name: BRO1
*2...Made by Japan Synthetic Rubber Co., Ltd, product name: SBR#1500
*3...Made by America's Monsanto Company, product name: Santoflex13
*4...N-oxydiethylenebenzothiazyl-2-sulfenamide
*5...Abrasion resistance was measured using the Lambourn abrasion test machine, and expressed by indexing the value for rubber type B as 100.

Embodiments 1~3, Comparisons 1~8

The rubber composition of the rib's central portion and peripheral portion were chosen based on the combination of the various types of rubber compositions shown in Table 2, and based on the structure shown in Figure 3, the abrasion resistance and resistance to irregular abrasion were evaluated for each of the trial-production pneumatic tire.

Furthermore, Comparisons 1, 4, and 6 are respectively treads of single rubber type B, C, or D. In addition, the rubber thickness of the peripheral portion is 5 mm for whichever one. The obtained results are shown together in Table 2 below.

Table 2

| | Comparison 1 | Comparison 2 | Comparison 3 | Embodiment 1 | Embodiment 2 | Comparison 4 | Embodiment 3 | Comparison 5 | Comparison 6 | Comparison 7 | Comparison 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Central portion rubber type E' (kgf/cm$^2$) | B (80) | A (50) | A (50) | B (80) | B (80) | C (120) | C (120) | C (120) | D (150) | D (150) | D (150) |
| Peripheral portion rubber type E' (kgf/cm$^2$) | B (80) | C (120) | D (150) | C (120) | D (150) | C (120) | D (150) | E (200) | D (150) | C (120) | E (200) |
| Peripheral portion E' – central portion E' | 0 | 70 | 100 | 40 | 70 | 0 | 30 | 80 | 0 | -30 | 50 |
| Abrasion resistance index *1 | 100 | 93 | 92 | 105 | 103 | 123 | 119 | 115 | 95 | 97 | 95 |
| Resistance to irregular abrasion | X | X | X | Δ | O | X | O | X | Δ | X | Δ |

*1...Expressed by indexing the result of Comparison 1 as 100. The larger the value, the better the result is.
*2...O: irregular abrasion, Δ: A little bit, X:Have

Embodiment 4, Comparisons 9~10

Next, the effects of the rib's peripheral portion's rubber thickness on abrasion resistance and resistance to irregular abrasion were evaluated. The rubber composition of the central portion in Embodiment 4 as well a Comparisons 9 and 10 was of rubber type C, and the rubber composition of the peripheral portion was of rubber type D. The rubber thickness of the peripheral portion is as shown in Table 3. The results obtained are shown in Table 3.

Table 3

| | Comparison 9 | Embodiment 4 | Comparison 10 |
|---|---|---|---|
| Peripheral thickness (mm) | 0.1 | 3 | 20 |
| Abrasion resistance index *1 | 123 | 121 | 100 |
| Resistance to irregular abrasion *2 | X~Δ | O | O |

*1...Displayed by expressing the abrasion resistance of the tire of Comparison 1 of Table 2 as 100. The larger the value, the better the result is.

*2...O: irregular abrasion, Δ: A little bit, X:Have

From Table 2 and Table 3, it is known that it is not possible to improve the abrasion resistance and resistance to irregular abrasion at the same time for the previous single treads or combination treads, but this invention allows these to be improved at the same time.

In this embodiment, a pneumatic tire having the basic rib pattern shown in Figure 3 was used, and the same test as that of the pneumatic tire having the basic block pattern shown in Figure 1 was carried out, and although the same results are obtainable, it can be confirmed that they are obtainable by enlarging the differences.

(Effectiveness of the Invention)

As explained above, for the pneumatic tire of this invention, it became possible to improve at the same time, the abrasion resistance and the resistance to irregular abrasion that previously could not be improved.

4. Brief Explanation of the Drawing(s)

Figure 1, Figure 2 and Figure 4 are respectively plan views each showing the tread portion of an example of the pneumatic tire of this invention.

Figure 3 and Figure 5 are respectively sectional views each showing the tread portion of an example of the pneumatic tire of this invention.

1...Block or rib
2...Central portion of block or rib
3...Peripheral portion of block or rib
4...Main groove
5...Edge portion

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Figure 1

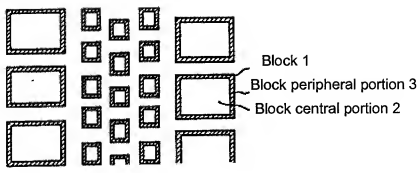



Figure 2

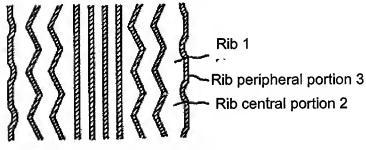



Figure 3

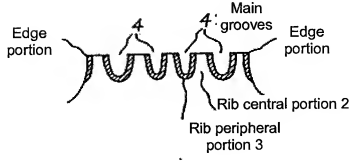


Figure 4

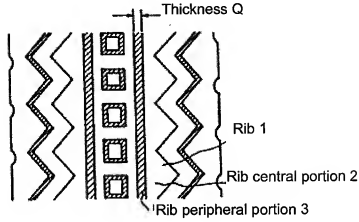
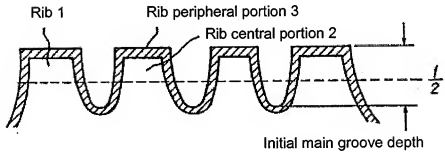



Figure 5



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審査請求　未請求　請求項の数 4　(全5頁)

㊹発明の名称　空気入りタイヤ

㉑特　願　平1−70039
㉒出　願　平1(1989)3月22日

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## 明　細　書

1.発明の名称　空気入りタイヤ

2.特許請求の範囲

1.　踏面に、切込んだ主溝によって踏面を区分して複数のブロックまたはリブを形成したトレッド部を有する空気入りタイヤにおいて、

前記ブロックまたはリブの周囲部にこれらの中央部と異なるゴム組成物を厚さ 0.3〜10 mmで配置し、

室温において、中央部のゴム組成物の動的弾性率(1)が60〜 140kgf／cm² でかつ周囲部のゴム組成物の動的弾性率(2)が 110〜 190kgf／cm² であり、

上記動的弾性率(2)の値から上記動的弾性率(1)の値を引いた値が10〜90kgf／cm² の範囲内にあることを特徴とする空気入りタイヤ。

2.　上記トレッドの両肩部のエッヂより3〜20 mmの範囲内が、ブロックまたはリブの周囲部を構成する上記ゴム組成物と同じゴム組成物より成る請求項1記載の空気入りタイヤ。

3.　ブロックまたはリブの周方向の側面のみに上記周囲部のゴム組成物を配置した請求項1または2記載の空気入りタイヤ。

4.　請求項1記載の空気入りタイヤにおいて、周囲部のゴム組成物が初期主溝深さの少くとも1/2 の高さの所から出現し、かつトレッド表面も該周囲部のゴム組成物で被覆されていることを特徴とする空気入りタイヤ。

3.発明の詳細な説明

(産業上の利用分野)

本発明は、耐偏摩耗性と耐摩耗性を同時に改良した空気入りタイヤに関するものである。

(従来の技術)

タイヤトレッドの踏面に接する部分は、一般に一種類のゴムで構成されている。しかし、接地面内に作用する力の分布、トレッドブロックの動きの分布、スリップ率の分布によって摩耗の程度に差が表われ、トレッドの接地面が不均一に摩耗し、いわゆる偏摩耗現象が発生してタイヤの寿命、外観等において好ましくなかった。

従来、このような偏摩耗に対しては、例えば特開昭51-100504号公報にあるようなトレッド肩部に耐摩耗性の高いゴムを配置する方法、あるいは特開昭53-80602号公報にあるような、トレッドの接地面に設けられた溝周囲にブロック幅の1/4乃至1/3に該当する厚さを有する、トレッドゴムより耐摩耗性の高いゴムを配置する方法が用いられてきた。

（発明が解決しようとする課題）

これらの方法によると確かに耐偏摩耗性の改良には効果があった。しかし、これらのタイヤの寿命は耐摩耗性の劣るトレッド中央部のゴム質に依存することになり、耐偏摩耗性は改良できたが、耐摩耗性そのもののレベルは十分ではなかった。

そこで、本発明の目的は、従来改善し得なかった耐偏摩耗性と耐摩耗性とを同時に改善した空気入りタイヤを提供することにある。

（課題を解決するための手段）

上記目的を達成するために、本発明の、踏面に、切込んだ主溝によって踏面を区分して複数のブロックまたはリブを形成したトレッド部を有する空気入りタイヤは、前記ブロックまたはリブの周囲部にこれらの中央部と異なるゴム組成物を厚さ0.3～10㎜で配置し、室温において、中央部のゴム組成物の動的弾性率 E′(1)が60～ 140kgf／㎠でかつ周囲部のゴム組成物の動的弾性率 E′(2)が110～ 190kgf／㎠であり、上記 E′(2)の値から上記 E′(1)の値を引いた値が10～90kgf／㎠の範囲内にあることを特徴とするものである。

本発明においては、好ましくは上記トレッドの両肩部のエッヂより3～20㎜の範囲内を、ブロックまたはリブの周囲部を構成する上記ゴム組成物と同じゴム組成物とする。

また本発明においては、ブロックまたはリブの周方向の側面のみに上記周囲部のゴム組成物を配置してもよい。

更に本発明においては、前記空気入りタイヤにおいて、周囲部のゴム組成物を初期主溝深さの少くとも1/2の高さの所から出現させ、かつトレッド表面も該周囲部のゴム組成物で被覆することができる。

（作　用）

空気入りタイヤのショルダー、リブ、ブロック等のエッヂを核として発生する偏摩耗は、接地面内の例えばブロックにおいて、その中央部に比べ周囲部の方が動き量、スリップ率共に大きく、摩耗が速く進展することにより起こることが知られている。従って、本発明においては、第1～3図に示す構造としてブロックまたはリブ1の周囲部3に中央部2よりも高い弾性率を持つゴムを配し、ブロックまたはリブの動き、スリップ率を全体的に均一化することにより、耐偏摩耗性の改良を図ることとした。また、耐摩耗性に重要な中央部2のゴム組成物は、動的弾性率を所定の範囲内に設定しさえすれば他の物性を自由にコントロールできるので、同時に耐摩耗性を上げるべく調整することが十分可能である。このようにして、耐偏摩耗性と耐摩耗性とを同時に改善した空気入りタイヤを得ることが可能である。

この際、周囲部3のゴム組成物の厚さは 0.3～10㎜、好ましくは 0.5～5㎜とする。 0.3㎜未満であると耐偏摩耗性の改良が見られず、一方10㎜を超えると耐摩耗性の向上が少なくなってしまう。

エッヂ部5についても同様の理由により、トレッドの両肩部のエッヂ5より3～20㎜の範囲内に周囲部3のゴム組成物が入ることが必要である。

また、第4図に示すように、周囲部3のゴム組成物を有するブロックまたはリブ1はトレッド面の全面にある必要はなく、適宜部分的に配すればよい。さらに、周囲ブロックの厚さ(Q)も全て均一である必要はなく、上記厚さの範囲内であれば場所により異なっていてもかまわない。

また本発明においては、上記中央部のゴム組成物の室温における E′(1)は60～ 140kgf／㎠、好ましくは80～ 120kgf／㎠の範囲内にある必要がある。 E′(1)が60kgf／㎠より小さいと実質上耐摩耗性の改良効果が十分ではなく、逆に 140kgf／㎠より大きいと発熱老化性の面で適当ではない。周囲部3のゴム組成物についても室温における E′(2)は 110～ 190kgf／㎠、好ま

しくは 140～ 180kgf／cm² の範囲内にある必要がある。 E′(1)が 110kgf／cm² より小さいとブロックの動きの十分な抑制、均一化効果が得られず、一方 190kgf／cm² を超えると発熱、老化性（クラック）あるいは耐カット性の面で不適当である。さらに、 E′(2)— E′(1)で表わされる E′の差は10～90kgf／cm² 、好ましくは20～60kgf／cm² の範囲にあることが必要である。この範囲を逸脱すると中央部２と周囲部３のゴムの動きを十分に均一化できないという問題や、界面からの破壊等の問題点が生じる。

本発明の空気入りタイヤは、例えば、グリーンタイヤ成型時にブロックまたはリブ１の中央部２を構成する前記トレッドゴムの上にブロックまたはリブの周囲部３を構成する前記ゴムをシート状にして貼り付けてモールド内で加硫した後、トレッドパターンの表面を所定の２層構造になるよう削り取ることにより得られる。また、第５図に示すように、トレッドパターン表面を削り取ることなく、表面をブロックまたはリブ１の周囲部を構成するゴムで覆い、主溝４の初期主溝深さの少なくとも1/2 の高さの所から当該周囲部のゴムが現われて２層構造となるようにしてもよい。この理由は、走行初期で著しい偏摩耗が表われることはまれで、残ミゾが少なくとも1/2 になった所でかかる２層構造が現われれば耐摩耗性および耐偏摩耗性の改良は十分達成できるといえるからである。また、工業的生産性を考えた場合、トレッド表面を削ることは非現実的であり、表面を周囲部３のゴム組成物で覆ったまま製品とする方がより現実的であるといえる。

尚各ゴム組成物の E′ は、岩本製作所製スペクトロメーター試験機を用いて、幅５mm、厚さ２mmの短冊状試料で振動数50Hz、動歪１％で25℃にて測定した。

（実施例）

以下に実施例を示し、本発明をさらに詳細に説明する。

４本の溝をトレッド接地面に有するサイズ10.00 R20の空気入りタイヤ（第３図参照）に、第１表に示す配合割合（重量部）で配合したゴム組成物を組み合わせたトレッドを配し、各種構造の試作タイヤを作った。耐摩耗性、耐偏摩耗性の評価は、４万Km走行後の残ミゾ量と、トレッド接地面の観察によって夫々行なった。

第 1 表

| ゴム種 | A | B | C | D | E |
|---|---|---|---|---|---|
| 天然ゴム | 100 | 100 | 70 | 55 | 40 |
| ブタジエンゴム *1 | — | — | 30 | — | — |
| スチレン-ブタジエンゴム *2 | — | — | — | 45 | 60 |
| ISAFカーボンブラック | 45 | 50 | 55 | 50 | 55 |
| ステアリン酸 | 2 | 2 | 2 | 2 | 2 |
| 老化防止剤 *3 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Z n O | 3 | 3 | 3 | 3 | 3 |
| 硫 黄 | 1.3 | 1.5 | 1.5 | 1.0 | 1.1 |
| 加硫促進剤(Nobs) *4 | 1.1 | 1.1 | 1.1 | 1.1 | 1.3 |
| E′ Ogf/cm²) | 50 | 80 | 120 | 150 | 200 |
| 耐摩耗性 *5 | 95 | 100 | 130 | 95 | 95 |

＊1…日本合成ゴム製、商品名 BR01

＊2…日本合成ゴム製、商品名 SBR#1500

＊3…米国モンサント社製 商品名 サントフレックスI3

＊4…N-オキシジエチレンベンゾチアジル-2-スルフェンアマイド

＊5…耐摩耗性は、ランボーン式摩耗試験機にて測定し、ゴム種Bの値を１００としたときの指数で表わした。

実施例１～３，比較例１～８

下記の第２表に示す各種ゴム組成物の組み合わせによりリブの中央部と周囲部のゴム組成物を選択し、かつ第３図に示す構造にて試作した空気入りタイヤにつき前記耐摩耗性および耐偏摩耗性の評価を行った。

尚、比較例１，４，６は夫々ゴム種Ｂ，Ｃ，Ｄ単独のトレッドである。また、周囲部のゴム厚はいずれも５㎜である。得られた結果を下記の第２表に併記する。

第２表

| | 比較例1 | 比較例2 | 実施例1 | 実施例2 | 比較例4 | 実施例3 | 比較例5 | 比較例6 | 比較例7 | 比較例8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 中央部ゴム種 | B | A | B | B | C | C | C | C | D | D |
| 〃（kg/cm²） | (93) | (50) | (90) | (93) | (120) | (120) | (120) | (120) | (130) | (150) |
| 周囲部ゴム種 | B | C | D | C | D | C | D | E | C | C |
| 〃（kg/cm²） | (93) | (120) | (120) | (150) | (120) | (150) | (150) | (200) | (120) | (200) |
| 耐摩耗性指数*1 中央部定 | 0 | 70 | 40 | 70 | 0 | 30 | 0 | 80 | 0 | 50 |
| 耐摩耗性指数*1 周囲部定 | 100 | 93 | 105 | 103 | 125 | 119 | 115 | 115 | 95 | 97 |
| 耐偏摩耗性*2 | × | × | △ | ○ | × | ○ | × | × | △ | × |

*1…比較例１の結果を１００として指数表示した。数値が大なる程結果が良好。

*2…○：偏摩耗なし、△：微少あり、×：あり

第２表および第３表より、従来の単一トレッドまたは組み合わせトレッドでは耐摩耗性と耐偏摩耗性とを同時に改善することは不可能であるが、本発明によるとこれらを同時に改善することができることが分る。

本実施例においては第３図に示すリブ基調のパターンを持った空気入りタイヤを用いたが、第１図に示すようなブロック基調のパターンを持った空気入りタイヤで同様な試験を行っても同じ結果が得られ、しかも差がより拡大して得られることが確認されている。

実施例４，比較例９，10

次に耐摩耗性および耐偏摩耗性に対するリブの周囲部のゴムの厚さの影響につき評価を行った。

実施例４および比較例９，10ともに中央部のゴム組成物をゴム種Ｃとし、かつ周囲部のゴム組成物をゴム種Ｄとした。周囲部のゴム厚は下記の第３表に示す通りである。得られた結果を下記の第３表に示す。

第　３　表

| | 比較例９ | 実施例４ | 比較例10 |
|---|---|---|---|
| 周囲部厚さ（㎜） | 0.1 | 3 | 20 |
| 耐摩耗性指数*1 | 123 | 121 | 100 |
| 耐偏摩耗性 *2 | ×～△ | ○ | ○ |

*1 …第２表の比較例１のタイヤの耐摩耗性を１００としたときの指数表示。数値が大なる程結果が良好。

*2 …○：偏摩耗なし、△：微少あり、×：あり

（発明の効果）

以上説明してきたように、本発明の空気入りタイヤでは、従来改善し得なかった耐偏摩耗性と耐摩耗性とを同時に改善することが可能となった。

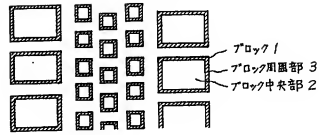
4.図面の簡単な説明

第１図、第２図および第４図は夫々本発明の一例空気入りタイヤのトレッド部を示す平面図、

第３図および第５図は夫々本発明の一例空気入りタイヤのトレッド部を示す断面図である。

1…ブロックまたはリブ
2…ブロックまたはリブの中央部
3…ブロックまたはリブの周囲部
4…主溝　　5…エッヂ部

第1図

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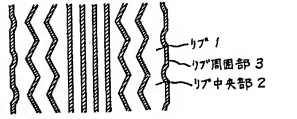
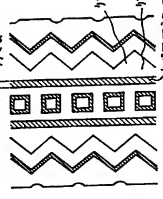
同　弁理士　杉村興作

第2図

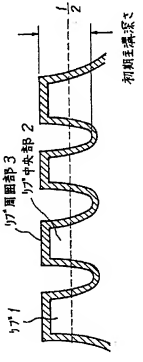



第3図


第4図




第5図



**PAT-NO:** JP402249707A
**DOCUMENT-IDENTIFIER:** JP 02249707 A
**TITLE:** PNEUMATIC TIRE
**PUBN-DATE:** October 5, 1990

**INVENTOR-INFORMATION:**

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|---|---|
| OHASHI, MASAYUKI | |
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**ASSIGNEE-INFORMATION:**

| NAME | COUNTRY |
|---|---|
| BRIDGESTONE CORP | N/A |

**APPL-NO:** JP01070039
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**ABSTRACT:**

PURPOSE: To improve resistance to partial wear along with resistance to normal wear by arranging each different rubber composite on the central part and the peripheral part of each block, etc., formed on the tread part, and setting the thickness and dynamic modulus of elasticity, etc.,

at room temperature of these rubber composites in specified ranges respectively.

CONSTITUTION: With a pneumatic tire, main grooves are cut in a tread to divide the tread and form plural blocks 1, etc., on the tread part. In this case, a rubber composite part which differs from that of the central part 2 is applied to the peripheral part 3 of each block 1, etc., with the thickness of 0.3-10mm. At room temperature, dynamic modulus of elasticity of the rubber composite on the central part 2 is set at 60-140kgf/cm2, and dynamic modulus of elasticity of the rubber composite on the peripheral part 3 is set at 110-190kgf/cm2. Further, a value obtained by subtracting the dynamic modulus of elasticity of the rubber composite on the central part 2 from the dynamic modulus of elasticity of the rubber composite on the peripheral part 3 is set to 10-90kgf/cm2.